NAVAL WAR COLLEGE
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MEDICAL INFORMATION TECHNOLOGY IN SUPPORT OF THE OPERATIONAL COMMANDER

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Maritime Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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15. Abstract: There are numerous factors that have driven the need for medical information technology in the operational setting. Two of the primary driving forces are the Presidential mandate, PL 105-85, and Presidential directive of November 1997. Other driving forces are the NMS, JV2010, Lessons learned from Desert Storm, changes in law and NCA direction, and most of all, the current changes in medicine and advancing technologies. DoD is aggressively pursuing a unified force health protection strategy to protect service members from medical hazards associated with their military service from accession through retirement. The FHP strategy thrusts preventive medicine and information technology into the forefront of operational health support. Initiatives since Desert Storm to decrease risks are as follows: (a) Standardized methods for identification of medical threats and applications of appropriate countermeasures prior to deployment; (b) Integrated and coordinated preventive medicine and continued medical and environmental surveillance throughout the operation, and; (c) Medical screening and analyses, both pre and post-deployment. This program relies on the exploitation of advanced technologies, including the electronic medical record, bio-sensing and NBC detection capabilities, and advanced clinical concepts for medical treatment. This paper will deal with the medical information technology portion of the Force Health Protection program. This paper will discuss the pros and cons of the medical information technology that currently supports the Force Health Protection Program and projects planned for the future.

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There are numerous factors that have driven the need for medical information technology in the operational setting. Two of the primary driving forces are the Presidential mandate, PL 105-85, and Presidential directive of November 1997. Other driving forces are the National Military Strategy, JV2010, lessons learned from Desert Storm, changes in law and National Command Authority direction, and most of all, the current changes in medicine and advancing technologies.

The above are being rolled up in the overall DoD Force Health Protection (FHP), program. DoD is aggressively pursuing a unified force health protection strategy to protect service members from medical hazards associated with their military service from accession through retirement. The FHP strategy thrusts preventive medicine and information technology into the forefront of operational health support.

Results today are significant and have shown tremendous benefits in the protection of our forces. Initiatives since Desert Storm to decrease risks inherent to military operations are as follows:

(a) Standardized methods for identification of medical threats and applications of appropriate countermeasures prior to deployment.

(b) Integrated and coordinated preventive medicine and continued medical and environmental surveillance throughout the operation, and

(c) Medical screening and analyses, both pre and post-deployment.

This program relies on the exploitation of advanced technologies, including the electronic medical record, bio-sensing and NBC detection capabilities, and advanced clinical concepts for medical treatment.

This paper will deal with the medical information technology portion of the Force Health Protection program. This paper will discuss the pros and cons of the medical information technology that currently supports the Force Health Protection Program and projects planned for the future. The systems I will discuss are as follows:

(a) Theater Medical Information Program (TMIP) - The overall medical technology portion of the Force Health Protection Program discussed in this paper.

(b) Telemedicine - Allows medical staffs to read/diagnose images received from the theater of operations.

(c) Portable Information Carrier - Provides a condensed record of care and visibility of the patient through the medical system..

(d) Medical Analysis Tool - Supports the OPLANS/CONPLANS

(c) TRAC^{2}ES - World-wide patient movement system managed at the Unified Command level from USTRANSCOM, Scott, AFB.

Medical Information Technology in Support of the Operational Commander

INTRODUCTION

> *"The Department of Defense has some impressive weapon systems. Each has a maintenance log and periodic check-ups to ensure they can carry out their mission. Now envision this for a moment...people are our most valuable and most complex weapon system, and the only one which gets better with time."*[1]

Therefore it is imperative that the military medical departments ensure that this complex weapon system is in top notch condition for its end user, the operational commanders.

Medical information technology is the backbone of the Department of Defense (DoD) Force Health Protection program. The question that arises is, what are the medical departments doing to ensure they are in concert with the vision set forth in JV2010, and how are they ensuring that the JFC's are aware of, and realize the benefits of, these advances in medical technology?

This paper will provide an overview of the Force Health Protection program and how it supports the Joint Force Commanders' (JFC) most important asset, their people. Then it will discuss the numerous medical information systems that the medical departments are currently using, have in development, and have planned for the future to make the warfighting force healthier and more efficient.

The medical departments have gone to great effort to ensure that the operational commanders are aware of what is available and how it will benefit them. "The requirement to plan for and provide medical support to personnel participating in military campaigns has

existed for as long as men have fallen on the battlefield and disease has rampaged through the ranks of the warrior."[2]

The Surgeon General of the Navy initiated a program in 1986 to create a full-time specialty within the Health Care Administration section of the Medical Service Corps for direct support to the warfighters. In 1991 the first 100 of these officers were designated as Plankowners[3] in the Plans, Operations, and Medical Intelligence (POMI) sub-specialty. This program has made such a vast difference in Navy medicine's support to the warfighters that the other services have followed suit. With the services' enormous dependence on information technology, the medical departments of the individual services have added another position to the Unified Commanders'and to Joint Staff: medical personnel with degrees in information technology.[4] This is how the medical departments ensure that the information technology needed to support the operational commanders is developed, implemented and supported in a joint effort. This has not alleviated the problem of the medical departments' having to take a back seat at operational meetings. The medical departments must continue to enhance their support to the warfighters. They must continue to integrate themselves into the warfighters' organization and thinking, for there can be no successful operation without fit and healthy troops and a technologically advanced medical system to support them.

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[1] Joint Staff, J4, Medical Requirements Division, Information Paper, dtd, 13Nov98
[2] Marghella, Pietro D., JMO Paper, "THE ROLE OF THE PLANS, OPERATIONS AND MEDICAL INTELLIGENCE (POMI)," UNCLASS, N, 420, F95, 1998
[3] In the Uniformed Services the first personnel assigned to a new organization are called "Plankowners."
[4] To enhance their performance the POMIs also manage the acquisition and administration of all finished medical intelligence products; attend Joint Medical Planners Course (JMPC); attend the Armed Forces Medical

BACKGROUND

Numerous factors have driven the need for medical information technology in the operational setting. Some of these driving forces are: the National Military Strategy; JV2010; lessons learned from Desert Storm; changes in law and National Command Authority direction; and most of all, the current changes in medicine and advancing technologies.

All of the above are being consolidated into the overall DoD Force Health Protection (FHP) program. The FHP is DoD's strategy to protect service members from medical hazards associated with their military service from accession through retirement. It is a concept that is quickly becoming reality. The desired outcome of FHP is a healthy and fit force for the operational commanders.

FHP will be the road map to a healthy force. The military medical community has embraced and adopted this philosophy. They must now translate it into getting the right medical assets and ensuring that our operational commanders are educated as to the effectiveness of these capabilities. The medical departments must continue to push for newer technology to be utilized whenever and wherever needed.

FHP introduces a life-cycle management program for our most complex weapon system, as stated before, our people! There are three pillars of FHP:

1. "**Healthy and Fit Forces** - A healthy and fit force is the necessary precondition for all other elements of FHP. Its importance cannot be exaggerated. The most important weapon system in the U.S. military is people, and their health and fitness is the basic guarantor of military success at all levels of engagement.
2. **Casualty Prevention** - The second pillar, casualty prevention, protects

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Intelligence (AFMIC) Course; Combat Casualty Care Course (C4); Medical Regulating Program and the Strategic Medical Contingency Course (SMRCC), all to enhance their worth to the warfighters.

the healthy and fit service member from environmental, occupational and operational threats. Disease Non-Battle Injuries (DNBI) historically account for the majority of battlefield admissions. A productive casualty prevention program is an operational force multiplier.

3. **Casualty Care and Management** - The third component of the FHP strategy builds on the traditional strengths of military medicine: using improved technology and mobility to achieve a lighter, faster, more responsive medical capability."[5]

Since Healthy and Fit Forces will be attained prior to a member's reporting to their operational command, I will focus on the remaining two pillars. Military medicine has developed numerous medical information systems to cope with both Casualty Prevention and Casualty Care and Management, and to support the overall FHP program. This is why the medical department's FHP program compliments JV2010, the Chairman's view of the world in the year 2010.

THEATER MEDICAL INFORMATION PROGRAM (TMIP)

TMIP is the information systems architecture for the FHP program. TMIP will integrate the medical information systems, capture the medical record, and link care in the "Theater of Conflict" to the sustaining base in order to provide enhanced medical care to the warfighter.

The following is an overview of the TMIP program taken from the Joint Staff, J4, Medical Requirements Division briefing to the Joint Requirements Board on 11 December 1998. TMIP as a whole will address the following functional areas:

Command and Control - This is the medical side of command and control

Patient Regulation & Evacuation - This will be discussed later in this paper under TRAC^{2}ES

Health Care Delivery - This section will cover health care delivery from the battlefield back to CONUS hospitals.

Medical Logistics - The Defense Medical Logistics Support System has been developed to support this function. It has been readily accepted by the operational commanders since it helps reduces lift requirements.

Blood Management - Ensures that the JTF/CINC Surgeons are able to manage the appropriate types and amounts of blood being shipped to the theater of operations.

Medical Threat/Intelligence - This section will provide an important function in the tracking and evaluation of disease non-battle injuries (DNBI). This is a long overdue database that will allow us to track low levels of possible chem/bio exposures.

Medical Capabilities Assessment & Sustainability Analysis - This section will be covered in more detail in the Medical Analyses Tool portion.

TELEMEDICINE (TM)

Telemedicine (TM) is an umbrella term that covers various technologies used to transmit patient information to another medical facility for consultation and diagnosis. The U.S. Navy has demonstrated TM technology aboard the USS *GEORGE WASHINGTON* (CVN-73) and USS *ENTERPRISE* (CVN-65) in the Atlantic Fleet, and USS *CARL VINSON* (CVN-70) and USS *ABRAHAM LINCOLN* (CVN-72) in the Pacific Fleet. The Navy has also used it at naval hospitals Bethesda, Portsmouth, San Diego and even McMurdo Station in Antarctica, one of the U.S. military's most isolated duty stations. TM is a system that has proven its efficiency and return on investment by demonstrating the following results:

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[5] Joint Staff, J4, Medical Requirements Division, Draft, Capstone document on *Force Health Protection, dtd 06Oct98*.

"Showed a demand for use by documenting a potential demand for 18,000 TM consults per year, 67% of these consults showed enhanced care. This was followed by an avoidance of MEDEVACS by 28%, saving $4,400 per MEDEVAC, 155,000 air miles per year, and the potential to recoup 7,560 active work days."[6] In this era of decreasing force structure and funding, these are the type of results the JFC are looking for.

The downside of this system is that it uses a large amount of communications bandwidth, which is limited aboard ships.[7]

PORTABLE INFORMATION CARRIER (PIC) CONCEPT

The PIC is a computer chip that will store personal information about its owner and will play a significant role along the entire spectrum of medical care. In addition to immediate access to accurate information, the PIC will serve as the hand-carried, abridged electronic theater medical record (ETMR). The PIC will contain demographic information, medical history, problem list, deployability status, and casualty prevention training. The role of the PIC changes slightly at each level of care in the continuum. For example, at the platoon corpsman or battalion aid station level, the PIC will be the only record available to the provider. If the patient requires further treatment and/or evacuation, the PIC becomes an adjunct source of information and storage because of the enhanced communications and linkages available at higher levels of care. When a patient enters a field hospital, fleet hospital or hospital ship level of care, the PIC will be read into the military treatment facilities' (MTF) computer system. Medical encounters and treatment are then added into the

[6] Center for Naval Analysis, CRM 97-66.08, A Cost-Benefit Analysis of Shipboard Telemedicine, dtd 18 August 1997

[7] Medical images such as X-Rays require a large amount of bandwidth to transmit. Since bandwidth is a high priority aboard ships this has required images to be sent during non-peak hours.

ETMR. Upon discharge, the patient summary and recommendations for follow-on care will be downloaded to the PIC. During the evacuation process, in conjunction with the Patient In-Transit Visibility (ITV),[8] the PIC will be used to positively record a patient's location and treatment provided enroute.

The PIC and ITV, will be the tools the Surgeons will use to "locate Private Ryan."[9]

MEDICAL ANALYSIS TOOL (MAT)

Upon receipt of the Population-at-Risk (PAR) and the Casualty Estimates (CASEST)[10] from the JFC's the POMI on the staff will then utilize the MAT software, a computerized modeling system, to determine theater medical requirements in terms of anticipated patients, medical staff needed, and logistics requirements. These calculations include:

a. Theater Bed Requirements (Echelon III through V)[11] to support the PAR and CASEST (broken out by specialty and level of care);

b. Theater Tactical and Strategic Aeromedical Evacuation Requirements in coordination with USCINCTRANS TRAC^{2}ES system;

c. Detailed Medical Personnel Requirements by specialty, which is accomplished by inserting the type of medical facility that will be delivered to the theater, i.e., fleet hospital, surgical team, hospital ship, etc;

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[8] Patient ITV is the ability to locate and track, by name or other unique identifier, an individual patient's status and location within the joint patient movement system.

[9] The PIC will allow a person to be located anywhere in the medical system.

[10] The PAR and CASEST figures are provided to the theater medical planner through the coordinated efforts of the J1, J2, and J3, based on the total number of personnel participating in operations (J1), enemy threat to friendly forces (J2), and operational (battle) intensity (J3).

[11] Echelons of care are similar to echelons of commands except in reverse order. Echelon I, is buddy aid in the field; and as treatment capabilities increase, the echelon designation increases up to level V, which is a tertiary care facility such as Naval Medical Center, Bethesda or Walter Reed Army Medical Center.

d. Theater Class VIII (Medical) Logistics requirements above the organic sustainment capabilities of the deploying unit.[12]

Based on the information provided above, the MAT planning tool enables the JFC Surgeons to provide their JFCs an instant view of the medical assets needed in the theater. This is shown by the movement of forces based on the Time Phased Force Deployment Document (TPFDD). The TPFDD can be uploaded into the MAT software by combat forces and support personnel as shown below. This allows the POMI to track all the medical requirements that need to flow into the theater.

POPULATION AT RISK REPORT

ECHELON 2

Time	COMBAT TROOPS Buildup	COMBAT TROOPS w/Losses	SUPPORT TROOPS Buildup	SUPPORT TROOPS w/Losses
C+0-C+6	4133	4133	22	22
C+7-C+13	9257	9257	1592	1592
C+14-C+20	14257	14257	2592	2592
C+21-C+27	14555	14555	2813	2813
C+28-C+29	14555	14555	2813	2813

Figure 1: Population at Risk Report[13]

Figure 1 is just a small portion of one of the many reports that can be generated from the MAT software to keep the JFC Surgeons informed of medical loading and requirements in the theater. This software will improve the JFC Surgeons ability to coordinate all medical evacuations and patient movement within, and out of, the theater.

Since the medical staff will have the MAT modeling tool, the surgeons will be able to follow troop movement and size, therefore creating a clearer picture of the requirements in order to allocate medical assets to the appropriate place and time to support the combat

[12] The Medical Analysis Tool (MAT) replaced the JOPES Medical Planning Module (MPM) in 1997 as the only DoD approved, standardized system to be used by the Unified Commands and Joint Staff to predict wartime medical requirements.

forces. The JFC Surgeons can provide detailed reports on the numbers and types of injuries and how the evacuation assets are being utilized. The operational commanders at all levels feel this is an excellent system for keeping them apprised of the medical requirements in the theater.[14] The surgeons will have a complete picture of what needs supporting, thereby lessening the footprint and lift requirements for medical assets and allowing more lift for warfighting assets. The downside to this software is that it is labor intensive to keep accurate, real-time data, even with the ability of importing troop movements from the TPFDD.

UNITED STATES TRANSPORTATION COMMAND (USTRANSCOM) Regulating and Command & Control Evacuation System (TRAC^{2}ES)

USTRANSCOM, as a functional unified command, provides air, land, sea transportation and common-user transport management for DoD across the full range of military operations. It is the service sponsor and functional user of TRAC^{2}ES, and in this capacity, functions as the single DoD manager for inter/intra-theater patient movement.

DoD directives[15] tasked USTRANSCOM and the Assistant Secretary of Defense for Health Affairs (ASD/HA) to establish a centralized global command and control network for medical regulating and patient movement operations. This network had to provide In-Transit Visibility (ITV) of patients, or continual location, during movement. It had to support the full spectrum of military operations during peacetime and wartime. This network would integrate the processes and automated information systems for medical regulating, modes of

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[13] Ibid., pg. A-44

[14] This statement is my impression taken from an interview with CDR Mike Sashin, MSC, USN, while he was on the Joint Staff, J4 serving as the MAT project officer.

[15] Department of Defense directive 6000.12 and Department of Defense instruction 6000.11

patient transportation, and assignment of medical personnel and equipment to support joint patient movement. It had to support operations in both the Continental United States (CONUS) and geographic theaters outside the Continental United States (OCONUS), as well as provide decentralized execution for the geographic theater commands. What ASD(HA) and USTRANSCOM developed and is currently implementing is TRAC^{2}ES. "TRAC^{2}ES codifies policies, plans, procedures, doctrine, execution decision support, and advanced automated information technologies that permit resource-constrained and unconstrained patient movement actions."[16] Although TRAC^{2}ES covers all aspects of patient evacuation during peacetime and conflict, I will just concentrate on the sections that benefit and support our operational commanders.

a. **Patient In-Transit Visibility (ITV) -** This portion of TRAC^{2}ES will allow the operational commanders to track their troops throughout the joint patient movement system. Patient ITV includes identification, last known location, and itinerary (scheduled and actual), from initial reporting for movement to their final destination. This also allows easy query for those high profile patients who are being followed by flag officers, congressmen, and such.[17](See attachment A, page 17)

b. **Transportation Component Commands -** The USTRANSCOM Component Commands involved in the evacuation system are the U.S. Air Force Air Mobility Command, which provides common-user airlift, air refueling, and strategic aeromedical evacuation services to deploy, employ, sustain, and redeploy U.S. forces, and; the U.S. Navy Military

[16] TRANSCOM Regulating and Command & Control Evacuation System (TRAC^{2}ES), Concept of Operations, pg. 2, para. D., dtd 07 April 1998

[17] Good or bad, there are times when the operational commander must answer requests from higher authority regarding where little Johnny is, due to the request of a Senator/Congressman.

Sealift Command (MSC), providing common-user and exclusive sealift transportation to deploy, employ, sustain, and redeploy U.S. Forces. MSC does not get involved in patient movement unless it is with one of the two current hospital ships. (The very limited role U.S. Army Military Traffic Management Command, would play in the evacuation system does not merit its discussion here).

c. **Global Patient Movement Requirements Center (GPMRC)** - The GPMRC is USTRANSCOM's executive agent for patient movement. The GPMRC provides medical regulating and evacuation requirements planning for inter-theater aeromedical evacuation and intra-theater aeromedical evacuation for CONUS. The GPMRC coordinates patient movement requirements with the Mobility Control Center (MCC). The GPMRC also coordinates with other Patient Movement Requirements Centers (PMRC) to integrate plans and schedules. The GPMRC also serves as the CONUS PMRC. (See attachment B, page 17)

d. **Mobility Control Center (MCC)** - This is the command center of the Joint Mobility Control Group within USTRANSCOM. The MCC consists of east and west regional teams, a requirements (surface/air) team, and a global patient movement cell, among others. The MCC receives validated patient movement requirements from the Global Patient Movement Requirements Center (GPMRC) and directs the appropriate transportation component command to execute patient movement in support of the operational commanders.

e. **Theater JFC Command Center** - Commanders of geographic combatant commands receive support from USTRANSCOM to provide an integrated transportation system from origin to destination to include medical evacuation. USTRANSCOM will coordinate and integrate health services support to create a balance of bed and patient

movement capacity. The JFCs Surgeon will coordinates health services support to include the establishment of a PMRC. The JFC may then establish Joint Task Forces (JTF) or other command relationships that are needed depending on the operational scenario.

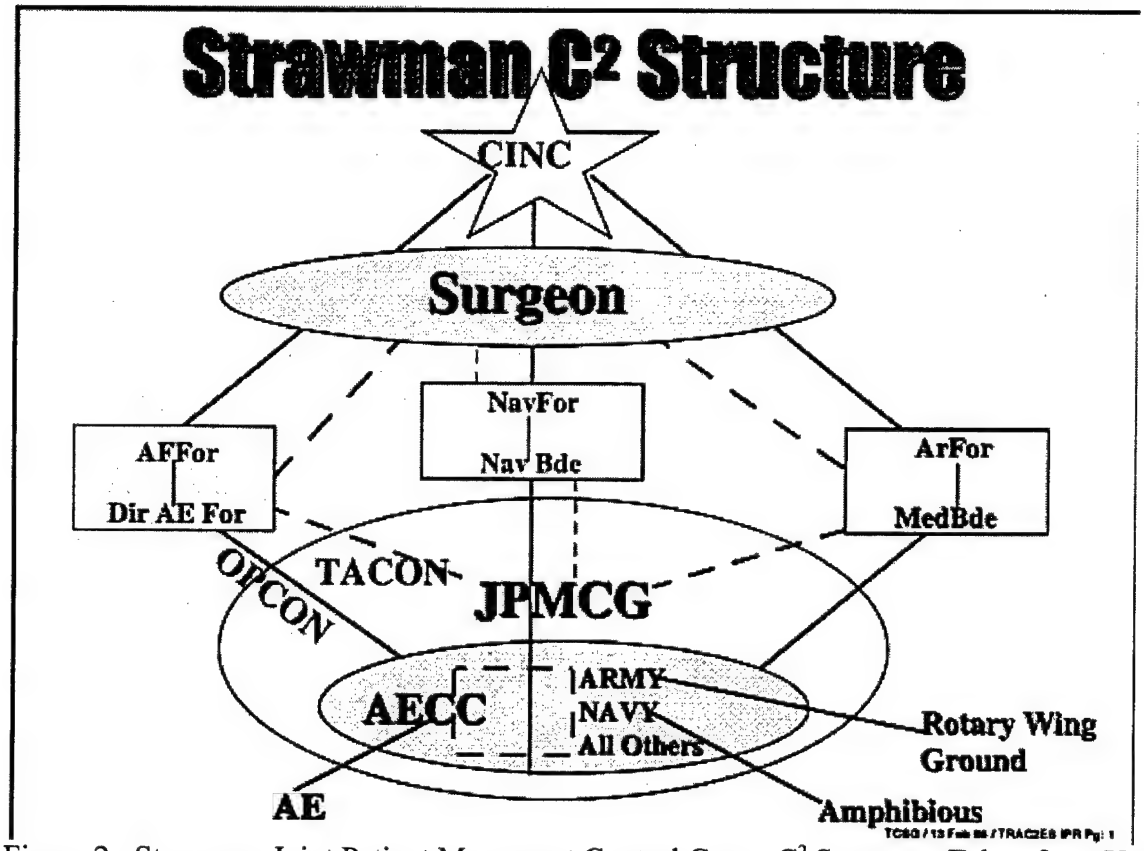


Figure 2: Strawman Joint Patient Movement Control Group C^2 Structure. Taken from United States Transportation Command, TRAC²ES, Concept of Operations (CONOPS), dtd 07 April 1998. This figure shows the communication flow between the aeromedical assets, the JPMCG and the JFC Surgeon.

f. **TRAC²ES Deliberate and Crisis Action Planning Activities** - These plans address the projected deployment, employment, sustainment, and redeployment of assigned and allocated forces for the proposed mission. Once deploying/in-place forces are identified and the potential contingency situation is assessed, notional patient movement plans, schedules, projected lift requirements, and estimated required patient movement assets and capabilities (forecasting) are determined. This information is then transmitted to the

transportation providers, planners, schedulers, and other support units for planning purposes.

This allows authorized users to develop and analyze time-phased patient movement and lift-bed plans for the designated OPLANS, contingency plans, concept plans (CONPLANS), "what-if" options, exercise support plans, and budgetary projections.

As you can see by the numerous functions provided within this section, TRAC^{2}ES was developed not only to support the operational commanders in executiion, but that every phase of its development was closely coordinated with their planners. The beauty of this system is that it meshes the medical requirements and planning phase into the operational commanders planning phases. The medical departments ensure that they provide the warfighting community the information they need when they need it by having medical personnel at all levels coordinating the operation of TRAC^{2}ES.

MEDICAL SCIENCE AND TECHNOLOGY (S&T) INITIATIVE GAME

The medical departments continue to search for better ways to support the operational commanders during war, looking not only within the services, but also to the private sector for new innovations. One thing that we must beware of, however, is the unnecessary use of new and improved technology, just because it is available. We must continue to ensure that what we bring into the theater is needed and not just fluff. We must not bog down our healthcare providers in the field with innovations that bring them no benefit. A primary example of this is helmet mounted video capability or hand held computers for use by the field corpsman/medics. These types of items do not enhance the care provided, and they only weigh down the healthcare provider when they need to be stabilizing patients and moving them on. There must always be a value added to any innovation we bring into the theater. It is up to the medical departments to ensure that they never forget their role of supporting the

warfighters in a way that does not hinder their operations and that is completely transparent to them.

As such, the medical departments participate annually in exercises such as VANGUARD 99. VANGUARD 99 was the Navy's second Medical Science and Technology Initiatives Game that focused on future biomedical research, development, testing and evaluation capabilities and requirements. Approximately 60 participants, consisting of a mixture of operational officers, medical personnel from operational commands, research technologists, and industry/academic representatives participated. The principal objective of VANGUARD 99 was to develop a prioritized listing of desired Navy biomedical capabilities to support the Marine Corps concept of Operational Maneuver From The Sea in the 2015+ time frame. Exercises such as these allow the medical departments to reinforce partnerships with both their warfighting counterparts and private industry, providing new and innovative solutions to projected problems. Workshops and wargaming exercises are just a couple of the ways the medical departments attempt to stay on top of the technological advances that are being made daily.

VALUE FOR THE WARFIGHTER

The overall TMIP system which incorporates the various systems and processes discussed in this paper will reduce the medical footprint in the theater of operations while improving efficiency through: improved medical operational planning; increased medical situational awareness; focused logistics for medical supplies, and a decrease in strategic lift. All of these improvements result in significant benefit to the JFCs.

TMIP will optimize patient evacuations while providing total asset visibility of both patients and logistics. It will reduce the time and resources needed for mobilization; it will

allow the conduct of medical and environmental surveillance to prevent casualties and maintain a healthy force. Most importantly, it enhances the health care delivery for the operational forces and will improve medical intelligence gathering. Figure 3 shows how all the pieces of the TMIP flow together to provide the JFCs a complete picture of how their troops are being cared for, at what locations. and their current duty status.

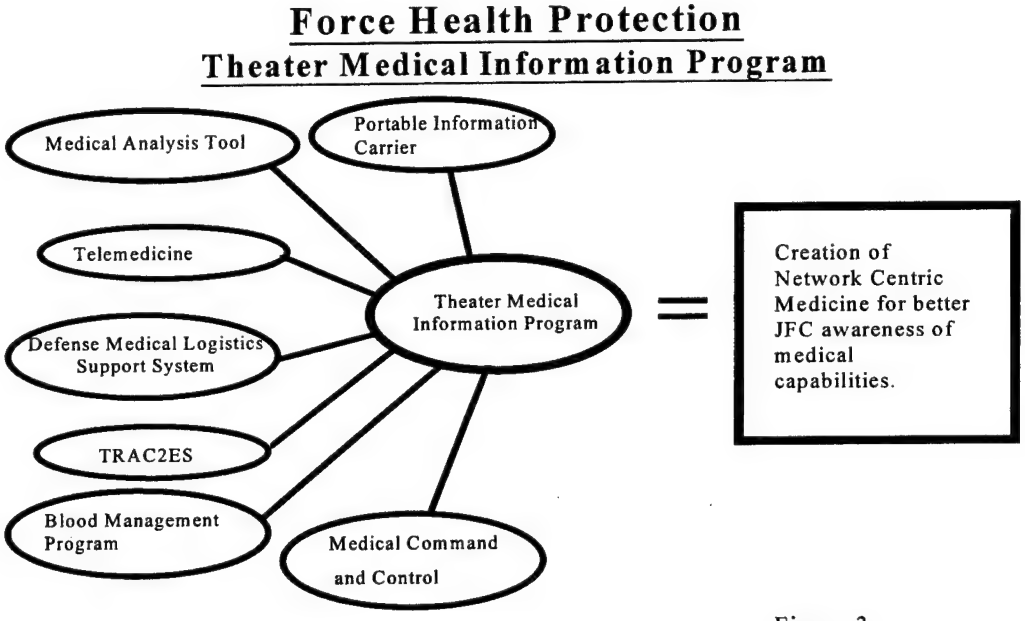


Figure 3

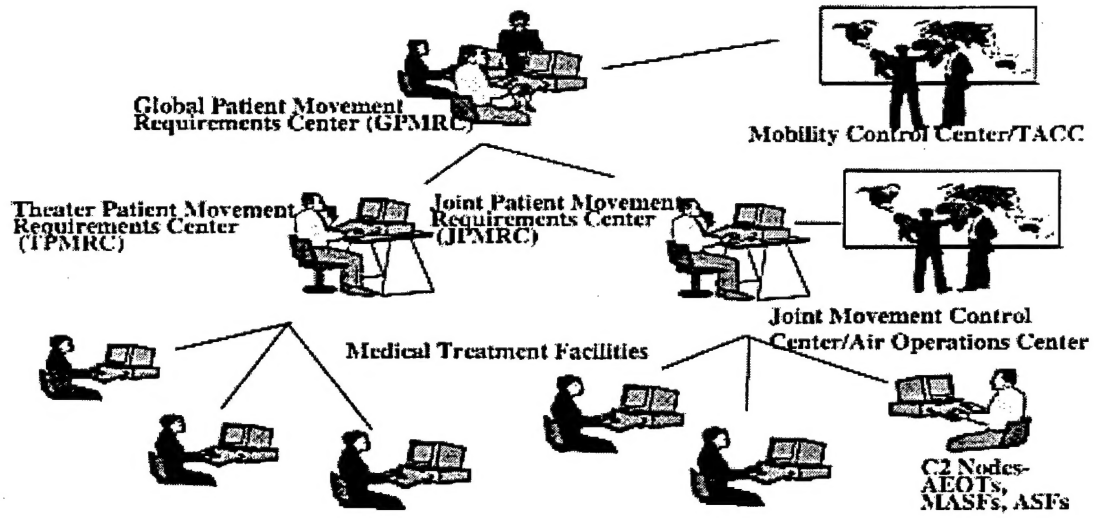
CONCLUSION

As stated earlier, the medical departments continue to search for ways in which to support their operational commanders. They continue to supply the billets required to keep the warfighters informed of what is available, and ensure they understand how it can be used to support them by saving them money, lift space, and enhanced care. This is extremely important, for as the battle for dollars continues, the medical departments must continue to excel in providing effective, cost-efficient systems to support the operational commanders

without decrementing peacetime medicine. The last two systems mentioned in this document have made a very positive impact on the operational commanders. These systems have supported the FHP program, and they have provided the JFC with a fit and ready force. Even with these accomplishments already in operation, the services' medical departments continue to look forward for newer, more efficient applications. The medical departments however must ensure that there is always a definite value added to any new technology brought into the theater. This new technology must be easily integrated into the operational commanders' current technical environment and enhance the overall FHP.

The medical departments, along with their warfighting counterparts, must continue to come together to participate in simulations like the VANGUARD exercise. It is through such simulations that new and innovative requirements are identified by the warfighters that the medical departments will need to provide for in the future.

Patient Movement Network



ATTACHMENT A Taken from United States Transportation Command, TRANSCOM Regulating and Command & control Evacuation System (TRAC^{2}ES) Concept of Operations (CONOPS), Version 1.0, dtd 07 April 1998

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